ESAG – Impact of Proposed Protein Consumption Changes

ESAG Position

The section "ESAG Position" has been partially removed from this version of the report. The following extract is provided to give context later in the report.

For context, the College's total estimated scope 1 and 2 emissions were 2631 tCO_2e in 2018. These are harder to abate emissions that typically will require capital investment. The College's full scope 1-3 emissions profile has not been completed but typically scope 1 and 2 constitutes around 5-15% of comparable businesses. Food is likely around 1750-2250 tCO_2e per annum.

UK Food Production Environmental Impact

A number of queries have been made regarding whether global averages for emissions are appropriate for use in calculating the impact of dietary change at Winchester. The short answer is that whilst it may impact welfare standards, it makes a limited difference to emissions.

The sourcing of meat at Winchester was reported in the operations paper presented at the Common Time meeting of ESAG:

Beef is predominantly sourced from the West Country and local farms in the Bristol area. All products are traceable. Lamb: free range, mainly sourced from the Devon and Somerset border, also with Red Tractor certification, grass-fed, free range; no lamb is bought from New Zealand. Pork: UK farm-assured and where possible sourced from farms in the south-west. Poultry: predominantly sourced from UK farm-assured poultry farmers. Turkey: farm-assured, currently from Garrets Lane Farm (Essex) and Valley Farm in Royston (Hertfordshire).

There is no further information regarding international poultry sourcing, but it is clear that nearly all meat is sourced from the UK.

Emissions from meat

Emissions from meat consumption vary internationally, but not consistently across different types of meat. This figure from Our World in Data, based on (Poore and Nemecek, 2018) is commonly used to illustrate this. It is worth noting that despite the variability it is inescapable that meat emissions exceed alternatives and full sustainability impact analysis tends to further that. The authors state '*We find that the impacts of the lowest-impact animal products exceed average impacts of substitute vegetable proteins across GHG emissions, eutrophication, acidification (excluding nuts), and frequently land use*' (Poore and Nemecek, 2018, p. 990).

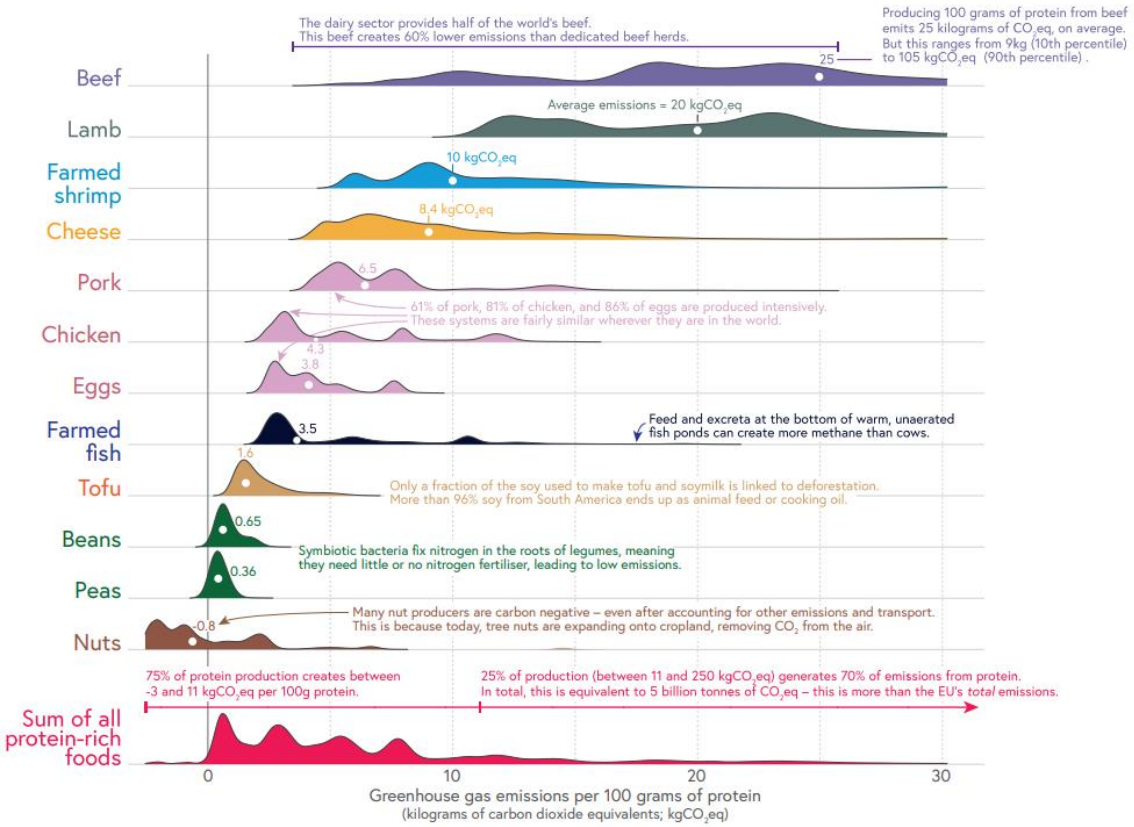


*Figure 1: The emissions associated with the production of food in different agricultural systems. (*Less meat is nearly always better than sustainable meat, to reduce your carbon footprint*, 2021) Data source: Poore and Nemecek (2018). Reducing food's environmental impacts through producers and consumers. Science.*

Pork and Poultry

Emissions for pork and poultry are driven by feed conversion efficiency and emissions per unit of feed. They are remarkably similar across a range of countries. This is due to intensification being a primary driver of emissions reduction across all types of meat and the consistency in which pork and poultry are produced globally. Emissions from production in Western Europe is approximately 50% higher than North America, but falls slightly lower than LAC and South Asia. The discrepancy is partly due to farming approach but also the prominence of soya based feed in Western European and LAC. The emissions from this are higher due to land use change impact. Tracking soya feed provenance is challenging and in 2017 only 13% imported into Europe was from rainforest certified sources (Fuchs, Brown and Rounsevell, 2020).

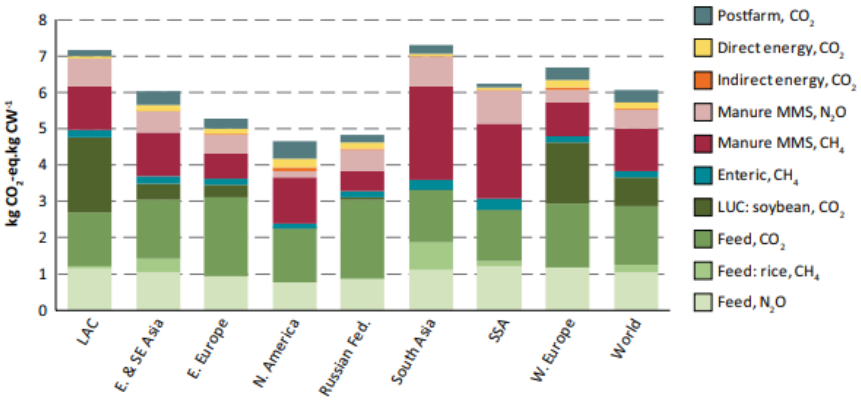


Figure 2: Pork emissions intensity by geographical region from MacLeod et al (2013) pg. 54.

In summary:

- **UK emissions are likely at the upper end of global emissions for this food source and care is needed over the sourcing of meat within the UK. Switching to imported meat is not viable or desireable.**
- **Seeking help from our suppliers with regard to soya feed certification or reduction may substantially reduce emissions.**

Beef

Emissions for beef are largely due to enteric CH_4 (methane release due to digestion).

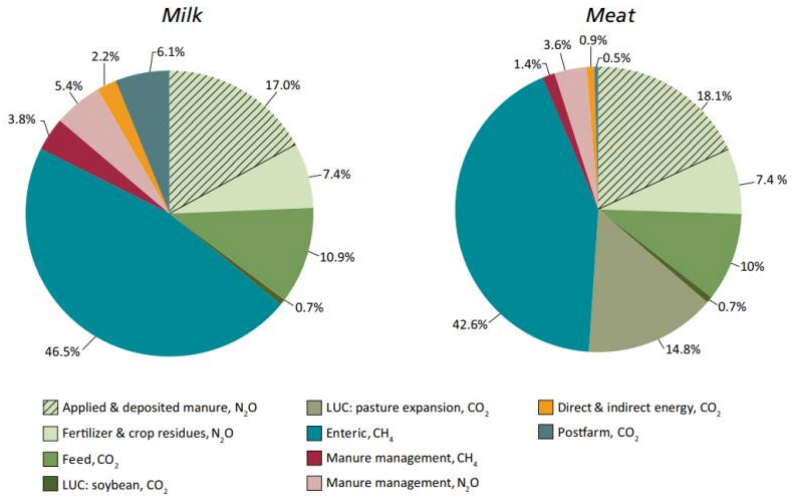


Figure 3:Global emissions from cow milk and beef supply chains, by emission category (Gerber et al. 2013)

This is variable across different regions due to different approaches to rearing animals.

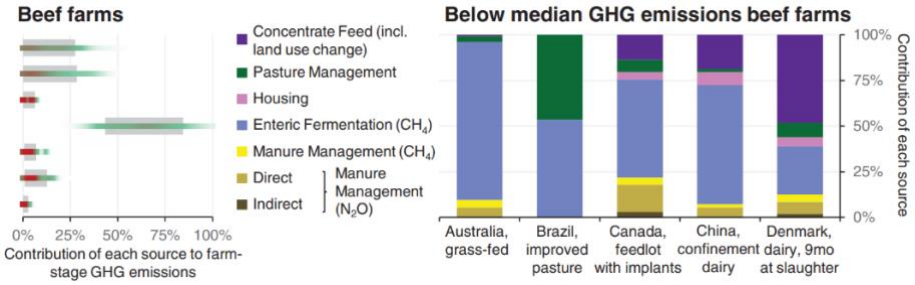


Figure 4: Contributions of emission sources to total farm-stage GHG emissions (Poore & Nemecek, 2018, pg. 990)

The key variable in all of the situations above is the length of time before the animal is slaughtered. Consequently, reducing emissions does not always result in improvement or maintenance of welfare standards. In the UK where the majority of our beef grazes for part or all of the year we can expect to be at the upper end internationally of emissions per kg of beef.

Whilst carbon sequestration capacity of grass-fed beef and wider ecological benefits should be considered, a thorough piece of research by the Oxford Martin School concludes: 'The inescapable conclusion of this report is that while grazing livestock have their place in a sustainable food system, that place is limited' (Garnett *et al.* 2017, pg. 125).

The key determinant of emission variation internationally (see Figure 5) is not farming approach but consumption habits. In the UK a relatively large proportion of beef is taken from dairy herds, around 33% (AHDB Cattle Yearbook 2019). Emissions per kg of meat from dairy herds are lower than from beef herds, 39.72 $kgCO_2EQ$ *vs* 99.48 $kgCO_2EQ$ respectively (Poore & Nemecek, 2018) as they are shared with dairy products.

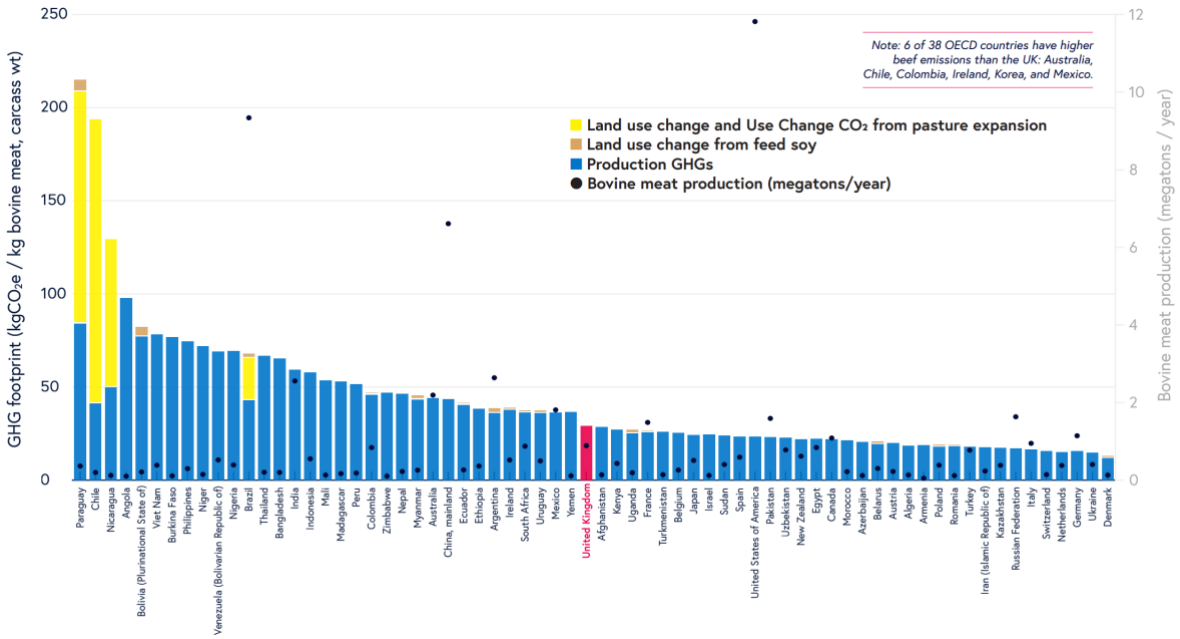


Figure 5: Global variations in emissions from beef *(Kim* et al*., 2020)* . Note that the units used differ from those elsewhere in this paper. This graph shows only the top few countries of the 140 studied countries.

In summary:

- **UK emissions from beef farming is likely at the upper end of global emissions for this food source due to the dominance of grazing, but on average they are lower than other countries due to the proportion of dairy herd beef consumed.**
- **Seeking help from our suppliers with regard to increasing the proportion of beef taken from dairy herds in addition to reducing consumption may reduce our emissions further.**

Lamb

Emissions from lamb production are impacted by many of the same factors as beef, predominantly CH_4 emissions that vary with the growing time required before slaughter, so full details will not be provided here.

There is one key difference with beef and that is that lamb is largely reared on marginal land and sheep grazing results in less carbon sequestration than beef in the area grazed. This means that a substantial amount of sheep pasture could be given over to carbon sequestering focused activities without a significant impact on UK food security. 9% of currently farmed land in the UK could be turned over with only a <1% reduction in production, and the majority of that land is sheep pasture (National Food Strategy, 2020). This 'opportunity cost' of farming marginal lands is not currently included in the analysis of emissions related to meat consumption at Winchester.

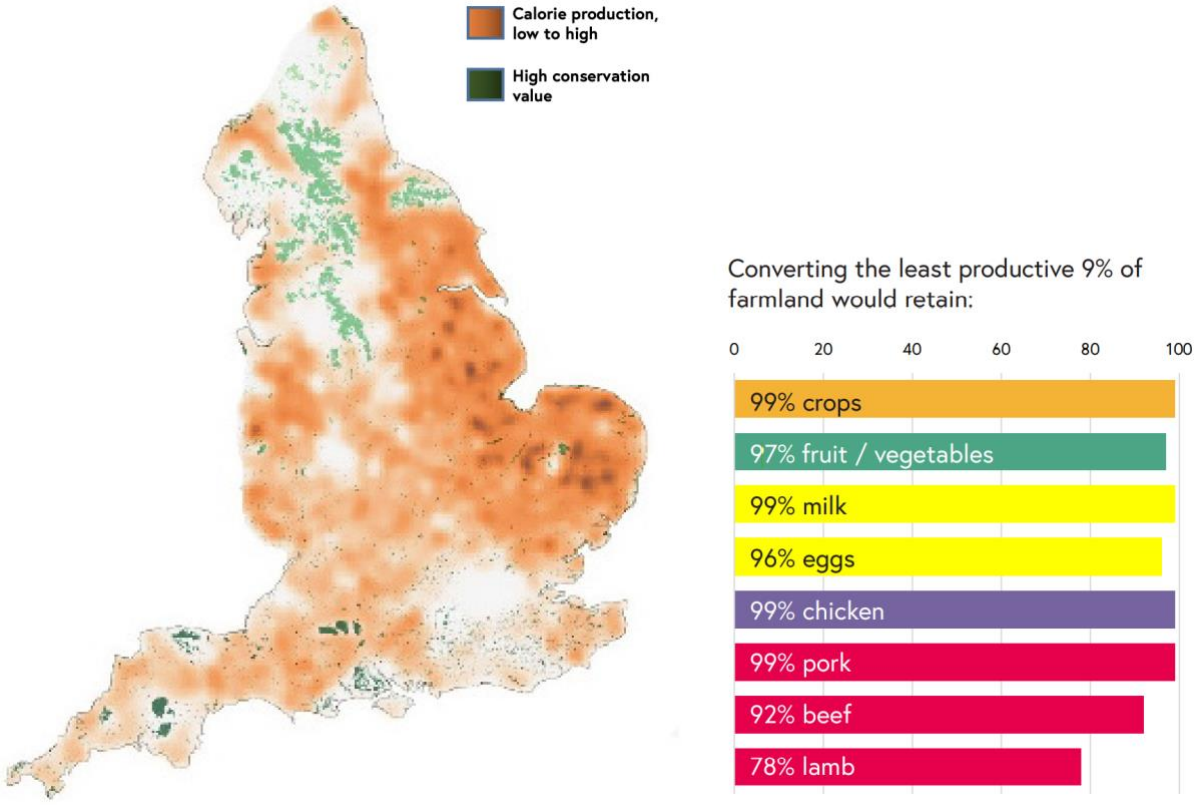


Figure 6: Impact on food production due to converting the least productive 9% of farmland to carbon sequestration focused activities (National Food Strategy, 2020)

In summary:

- **Adjusting the emissions reporting to include the carbon sequestration opportunity cost for land currently used for meat production would substantially improve the case for reducing meat consumption.**
- **Red meat emissions including this rise to in excess of 2500 tonnes tCO_2EQ, comparable to our Scope 1 and 2 emissions.**

Emissions from all other sources

Emissions from food production account for 34% of all emissions globally (Crippa *et al.*, 2021). Whilst this paper has focused on meat based emissions, evidently emissions do result from other aspects of the food production system. Figure 7 demonstrates the complexity of the industrialised world's food systems and the variable sources of emissions.

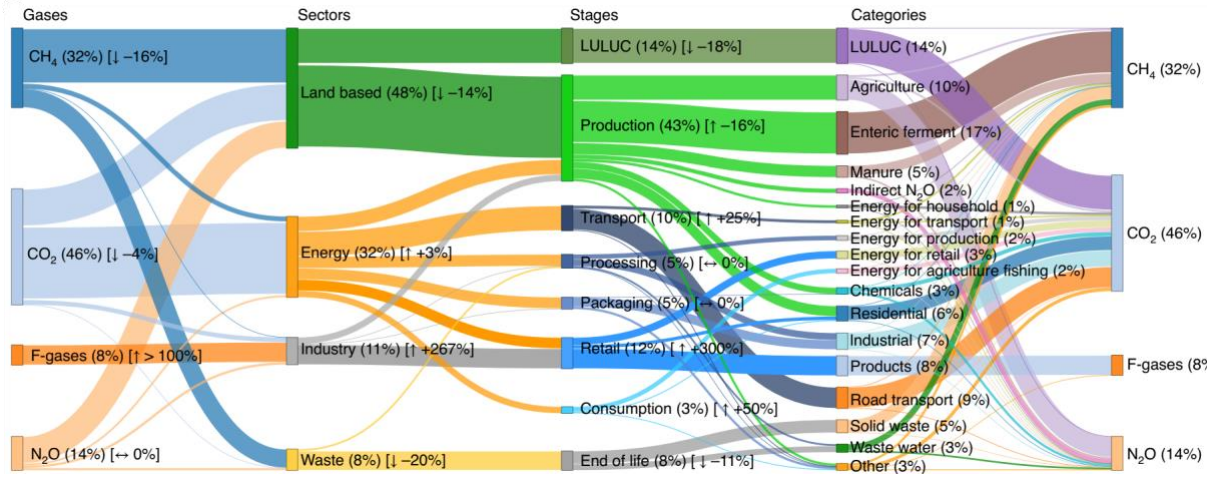


Figure 7: Sankey diagram for emissions from the food system of the industrialised world in 2015 (Crippa et al., 2021)

This Sankey diagram lacks the UK centric approach of the rest of the paper but does clearly outline some key issues. Around a 1/3rd of emissions are due to energy requirements and these can be expected to fall as the UK decarbonises energy production (100% renewables by ~2035). Transport is a very small contributor to emissions, and again emissions there can be expected to fall over the coming decades. Around 1/3rd of emissions are due to CH_4 emissions, and there is a less clear pathway to reducing these.

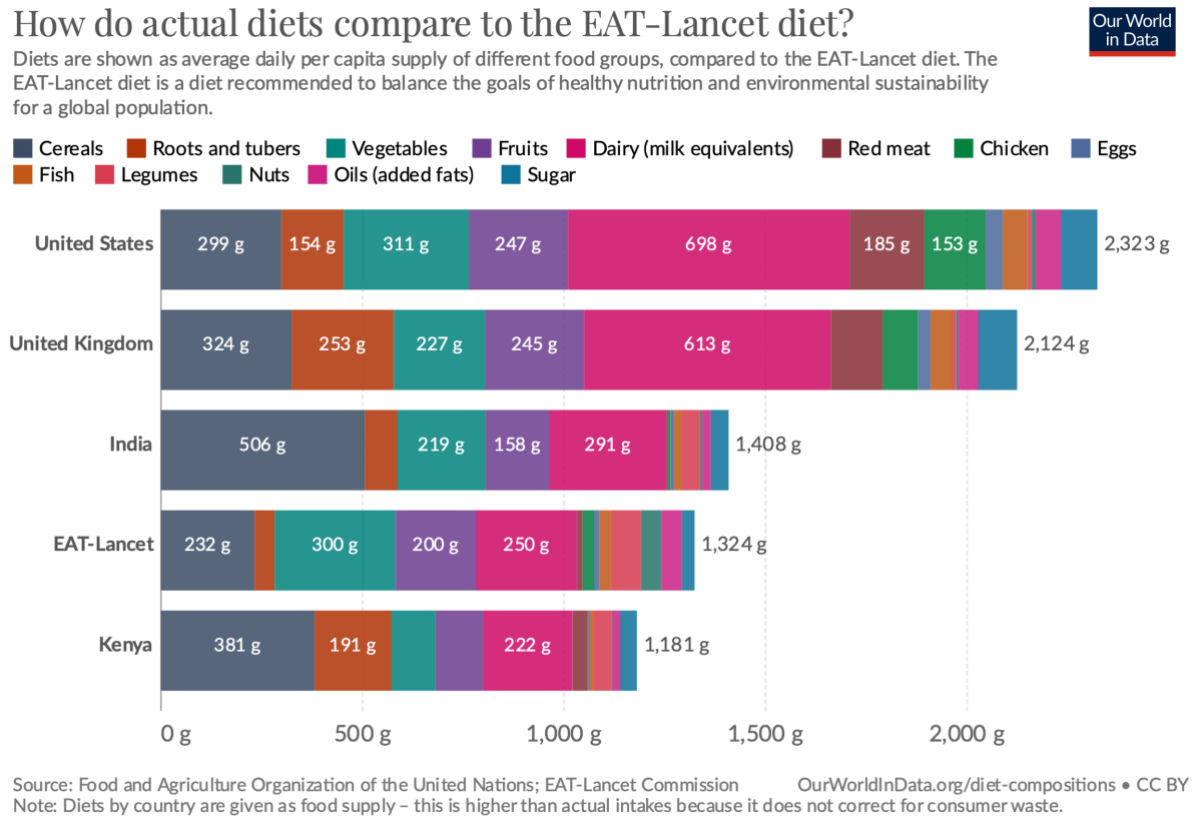
In summary:

- **Food production does have emission sources other than meat, but there are substantially better prospects for abating these. This leaves meat consumption reduction as an appropriate choice.**

Rationale for change

External Recommendations (Author: Oscar Mitcham VI:2)

This chart from Our World in Data (Food data from the UN FAO and EAT-Lancet from the recommended intake by the EAT-Lancet Commission) shows the difference in breakdown from where we are now to a recommended diet. The EAT-Lancet diet has the goal "To achieve planetary health diets for nearly 10 billion people by 2050."[1]



These data make it quite clear that the UK is not where it needs to be for a global average. As in their mission statement, EAT-Lancet sets out to transition to this diet by 2050 and sets out 5 strategies for doing so which could be adapted for Winchester College. Notably they suggest strong and coordinated governance of our land, halving food losses and waste (in line with UN SGDs) and increasing accessibility of healthy food and investing in/improving food marketing and education. The latter point is obviously particularly relevant to change within our setting.

The National Food Strategy says that the UK needs to make the following changes to the national diet by 2032 (all relative to 2019). 30% more fruit and vegetables, 50% more fibre, 25% less HFSS (High Fat, Sugar or Salt) Foods and 30% less meat[2]. They have analysed in detail 14 "concrete proposals for immediate action" which they put under 4 categories. Using these methods (some of which may be useful at Winchester College) they believe that their goals are feasible by 2032.

The Climate Change Committee includes eating more healthily including reducing red meat consumption and dairy as well as reducing food waste as a priority policy area in their 2021 Report

[1] https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report/
[2] NFS "The Plan" (Section 16) pg. 142. https://www.nationalfoodstrategy.org/

to Parliament. Their main pathway to Net-Zero includes a 20% reduction in meat by 2030 from a current average consumption of 1,045 g per week (2020 value). We obviously currently exceed this consumption figure.

None of these recommendations provide breakdowns by age group. Instead, they focus on the changes the country needs to make as a whole. Since many of the plans talk about the importance of changing education and marketing, it can be inferred that these plans expect young people to be the leaders in this transition.

International context (Author: Oscar Mitcham VI:2)

Emissions from food vary greatly by country per capita. A recent study by Kim et al. (2020) makes this clear. The black line shows the current average for the country, but the red line shows an adjusted OECD average to show how the international impact of food would vary if all countries took up a western diet.

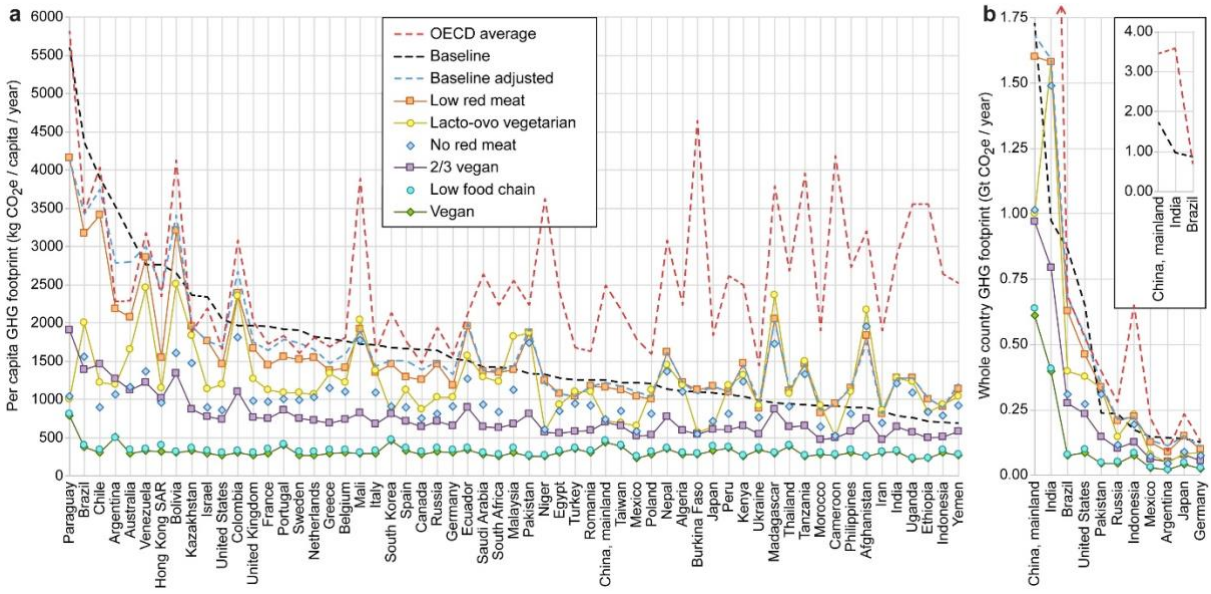


Figure 8: Impact of dietary shifts by country (Countries sorted by baseline footprint, showing only the 59 countries above the 58th percentile of the 140 countries studied).

The fluctuations in OECD average show how impact varies by country even with the same diet but as the diets become more plant forward the difference sourcing (transport, packaging, retail, agricultural methods) makes to impact per person is reduced and the changes in diet always have a really significant effect on the impact. The UK's current baseline places it 13th in the world within the 140 countries studied. This, if nothing else, should be a clear sign UK needs to be among the first to transition.

We can see that the UK average is about 2 tCO_2 eq/capita/yr however, using the calculations at the beginning, the average emissions of a Wykehamist is between 2.4 and 3.1 t CO_2 eq per 38 weeks. Accounting for the different timescales we can see that a pupil's average emissions while at school are 165%-210% of the average in the UK, which we will see is not good enough either. So not only is the UK one of the worst emitters in food Winchester College is itself one of the worst parts of that.

UK Dietary Change (Author: Oscar Mitcham VI:2)

Food is a deeply important to people. It is significant in cultures across the world. What this means is that dietary change is not as simple as telling someone to eat less meat or showing them the statistics. A lower meat diet needs to be compatible with the culture of the people it wants to affect. Winchester College is in the fortunate position of being able to affect how hundreds of pupils eat not just here, but how they view food and make decisions for the rest of their lives; and, looking that the data, we need change like this fast.

This report has established that beef is an incredibly carbon-intensive food, and that poultry is more efficient, but generally it is better to eat entirely plant-based proteins. Despite this, consumption of meat, fish, and poultry is increasing in almost all age categories in 2017-2020 most sharply and consistently in the youngest age group, 18-24. Young people may have strong environmental values, but this is not reflected in their diets.

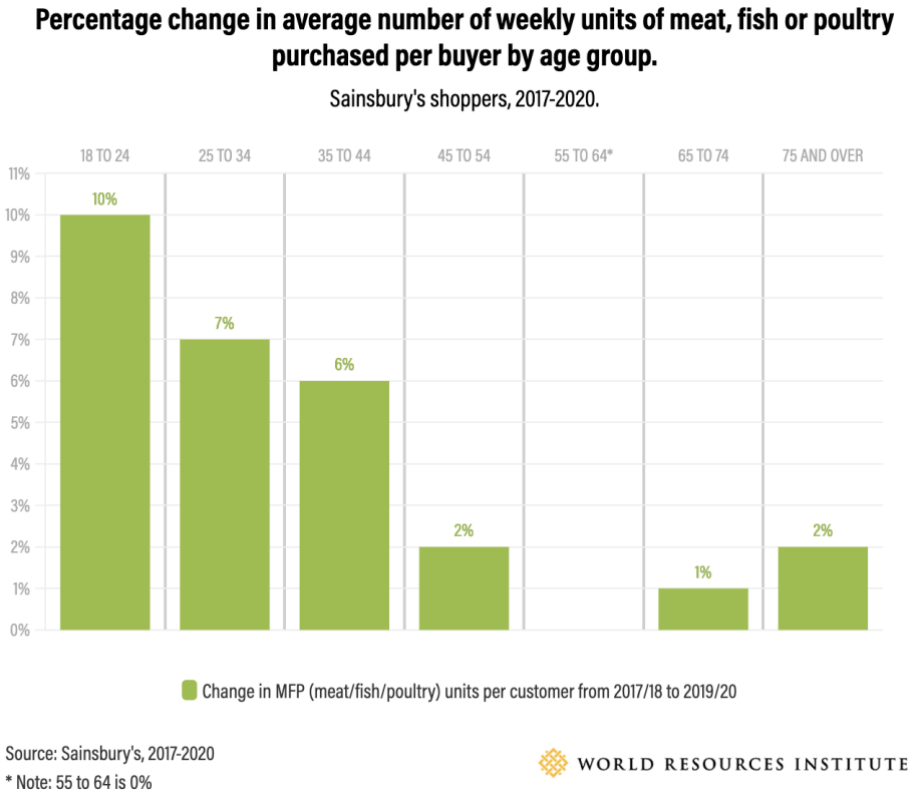


Figure 9: Percentage change in units of meat, fish or poultry purchased per buyer per age group.

The Food Standards Agency (FSA) notes a dissonance between 16-25yos' engagement with environmental issues and lack of engagement with the food system or awareness of its environmental impact: 16-25yos "think of themselves as environmentally-minded and ethically-informed"[3] but most also "[have] never thought about climate change in the context of the food system before."

This is not promising news. It shows that systemic changes need to happen to reduce our emissions from food (as pupils' individual actions will not go far enough if they follow the societal trend). The

[3] In the year 2021-22 pupils said that the environment was very important to them (~8/10). VI:1 (no longer at the school) gave a distinctly lower score than other years at ~5/10. https://climatesoup.co.uk/20220613-oil/

FSA later notes that 16-25yos expect governance changes. Winchester College pupils care about the Climate, so pupils are likely to support dietary changes if they are implemented and framed suitably.

In summary, major, if gradual, changes to our diets are necessary to be sustainable, especially in the UK, and pupils are unlikely to make these changes themselves, so action is required from the College.

Appendix A: On Eating Healthily (Author: Oscar Mitcham VI:1)

The amount of data about how what we eat affects our health is only growing; unfortunately, even the most important information struggles to break out to the public. It is considering this that I thought it relevant to write an extra section for this report on how our diet affects our health. This serves as an additional argument to transition away from meat, rather than being focused on sustainability.

The global burden of disease study concluded that diets high in processed meat (which is anything that has been salted, cured, fermented, smoked etc.[4]) resulted in 130,000 additional deaths in 2017. Eating 50g of processed meat a day (~1 sausage) effectively removes 2 years from your lifespan. The EAT-Lancet report uses 3 statistical methods each of which predicts ~11 million premature adult deaths per year would be prevented if the globe ate the planetary health diet (of course this includes deaths from malnutrition as well as deaths from not eating healthily).

To focus specifically on one leading cause of death: the first signs of atherosclerosis (plaque build-up which causes heart disease, stroke, gangrene, and aneurysms) begin in childhood. One study found that 100% of children at age 10 had fatty streaks in their arteries *(J.P. Strong et al., 1969)*. Another study produced a scoring system for risk of heart disease in young people and found that the #1 risk factor was high non-HDL cholesterol *(McMahan et al., 2006)*. We should not wait on reducing this risk.

Data like this continues for many kinds of chronic disease and where it is less conclusive, the lack of downsides from eating more vegetables, legumes, fruits, greens etc. makes eating less meat a very compelling change (especially compared to side effects of drugs or risk during surgery which may be necessary later in life due to unhealthy dietary choices). I hope this section gives an idea of how being healthy and eating sustainability are highly compatible.

[4] The WHO defines processed meat as a Group 1 carcinogen and red meat as a group 2A carcinogen. Their definitions are here: https://www.who.int/news-room/questions-and-answers/item/cancer-carcinogenicity-of-the-consumption-of-red-meat-and-processed-meat

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